## REMARKS

In the this response, claims 1, 115, 117, 272, 319, 320, 368-373, 376, 377, 379-391, 393 and 394 have been amended and claims 113, 114, 118-122, 309, 378 and 392 have been canceled without prejudice or disclaimer. No new claims have been added. Thus, claims 1, 15-28, 31-35, 37-52, 55-63, 67, 69-75, 79-108, 110-112, 115-117, 123-256, 272, 319-362, 365-373, 376, 377, 379-391, 393 and 394 are currently pending in the case. However, claims 28, 31-35, 37-52, 55-63, 90-93, 101, 103-108, 136-179, 183-216, 218, 243-250, 256, 322, 325, 328-342, 357-359 and 386-388 have been withdrawn from consideration. Further examination and reconsideration of the presently claimed application are respectfully requested.

**Double Patenting Rejection**

Claims 1, 15-27, 67, 69-75, 79-89,94-100, 102, 110-119, 121-135, 180-182, 217, 219-242, 251-255, 272, 309-319-321, 323, 324, 326, 327, 343-356, 360-362, 365-373, 376-385 and 389-394 were rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-109 of U.S. Patent Application No. 12/474,921 (referred to herein as "the '921 application"). To expedite prosecution, a terminal disclaimer is submitted in a separate paper to obviate the double patenting rejection in accordance with 37 C.F.R. § 1.321(c). Accordingly, removal of this rejection is requested.

It is noted that several of the statements made in the Office Action to substantiate the double patenting rejection are traversed for the record. In particular, the Applicant asserts the claims of the captioned application are patentably distinct from claims 1-109 of the '921 application. The fact that the claims of the two applications have overlapping scopes (i.e., they are both directed at coatings which may include an EC 3.1.8 enzyme as purported by the Examiner) does not constitute a supposition that they are not patentably distinct. To further substantiate the Applicant's assertion, it is noted that the Examiner is neglecting to acknowledge limitations in claims 1-109 of the '921 application which are not recited in the claims of the

captioned case (e.g., the inclusion of an antibiological peptidic agent in the claimed compositions).

The Examiner surmises on pages 3 and 4 of the Office Action that "The portion of the specification in [the '921 application] that supports the recited coatings include embodiments that would anticipate [claims of the captioned case] ...". Such conjecture is traversed, specifically in that the '921 application is not prior art to the captioned application and, thus, cannot anticipate the claims of the captioned application. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). (MPEP 2131) (underline added for emphasis).

The Examiner further states on page 4 of the Office Action, "Alternatively, [claims of the captioned case] cannot be considered patentably distinct over claims 1-109 of [the '921 application] when there are specifically disclosed embodiments in [the '921 application] that support claims 1-109 of that application and fall within the scope of [claims of the captioned case] because it would have been obvious to a skilled artisan to modify the coatings of claims 1-109 of [the '921 application] by selecting specifically disclosed embodiments that support those claims ...". This statement is not clear to the Applicant. Clarification is requested. In particular, it is not clear how the supposition of one skilled in the art to modify the coatings of claims 1-109 based on the disclosure of the '921 application has anything to do with the claims of the captioned case.

**Section 112, 2nd Paragraph Rejection**

Claims 21-27 were rejected under 35 U.S.C. § 112, second paragraph, for being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention. In particular, the Examiner deems the phrases "functional equivalent", "structural analog", and "sequence analog" indefinite because "the structural and functional limitations of the genera of any 'functional equivalent', 'structural analog', and 'sequence analog'

is unclear [and] the skilled artisan would not know the metes and bound of the recited invention" (page 6 of the Office Action). More specifically, the Examiner states on page 6 of the Office Action that the statements made in paragraphs [0121] and [0169] of the specification regarding the terms "functional equivalent", "structural analog", and "sequence analog" do not define the terms because:

(i) disclosure of what activity the encompassed enzymes may possess is not disclosure of what activity the encompassed enzymes do possess;

(ii) examples are not definitive;

(iii) the 'desirable chemical reactions', 'other desired enzymatic properties', 'desirable property', and 'undesirable property' are not defined;

(iv) the terms 'similar' and 'such as' are indefinite.

As set forth in detail below, the Applicant respectfully traverses the rejection.

The second paragraph of 35 U.S.C. 112 is directed to two separate requirements for the claims: (A) the claims must set forth the subject matter that applicants regard as their invention; and (B) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant (which refers to 'definiteness' of the claims) (see, MPEP 2171). It is not clear from the statements in the Office Action whether the Examiner deems claims 21-27 to be lacking one or both of the two requirements. Nevertheless, in the interest insure a complete response is provided for the rejection, arguments are presented below showing that claims 21-27 meet both requirements.

With respect to "Requirement A", the Applicant notes the following case law and patent examination guidelines cited in MPEP 2172:

> The invention set forth in the claims must be presumed, in the absence of evidence to the contrary, to be that which applicants regard as their invention. *In re Moore*, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971).
>
> Evidence that shows that a claim does not correspond in scope with that which applicant regards as applicant's invention may be found, for example, in contentions or admissions contained in briefs or remarks filed by applicant, *Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372, 55 USPQ2d 1279 (Fed. Cir. 2000); *In re Prater*, 415 F.2d 1393, 162 USPQ

> 541 (CCPA 1969), or in affidavits filed under 37 CFR 1.132, *In re Cormany*, 476 F.2d 998, 177 USPQ 450 (CCPA 1973). The content of applicant's specification is not used as evidence that the scope of the claims is inconsistent with the subject matter which applicants regard as their invention.

Applicant is not aware of any contentions or admissions contained in remarks filed by himself or in affidavits filed under 37 CFR 1.132 which would render the subject matter recited in claims 21-27 to not correspond in scope with that which is regarded as the invention. If the Examiner disagrees, citation of such contentions or admissions is requested to support this basis of rejection for claim 21-27. If not, it is asserted that claims 21-27 meet "Requirement A" of the second paragraph of 35 U.S.C. 112.

With respect to "Requirement B" of the second paragraph of 35 U.S.C. 112, the Applicant notes the following case law and patent examination guidelines cited in MPEP 2173.02:

> The essential question under 35 U.S.C. 112, second paragraph, is whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity. Definiteness of claim language is analyzed, not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art. In re Moore, 439 F.2d 1232, 169 USPQ 236 (CCPA 1971).
>
> The test for definiteness under 35 U.S.C. 112, second paragraph, is whether "those skilled in the art would understand what is claimed when the claim is read in light of the specification." *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986)

The Examiner acknowledges the phrase 'functional equivalent to the wild-type enzyme' is defined in paragraph [0121] of the specification as a proteinaceous molecule comprising a sequence and/or a structural analog of a wild-type enzyme's sequence and/or structure and functions as an enzyme. In addition, the Examiner acknowledges paragraph [0169] of the specification defines the term 'structural analog' as one or more chemical modifications to the peptide backbone or non-side chain chemical moieties of a proteinaceous molecule and defines the term 'sequence analog' as one or more chemical modifications to the side chain chemical

moieties, which is also referred to as a residue of one or more amino acid proteinaceous molecule's sequence.

In addition to providing clear definitions to the terms "sequence analog" and "structure analog", paragraph [0169] of the specification provides examples of chemical modifications which may constitute the terms. Likewise, paragraph [0121] provides examples of functional equivalents of a wild-type enzyme as well as examples of enzymatic properties which a functional equivalent enzyme may possess. With respect to the examples of enzymatic properties, the specification utilizes the term "similar" and phrases "desired properties", "undesired properties", and "desired chemical reactions". The Examiner notes the phrases are undefined and the disclosure of the examples and the term "similar" are indefinite (see page 6 of the Office Action). It appears the Examiner believes such indefiniteness renders the terms 'functional equivalent', 'structural analog', and 'sequence analog' indefinite. Such a line of reasoning is traversed.

In particular, it is asserted that those of skill in the art of biotechnology are aware and readily recognize what properties may be desirable and undesirable for an enzyme as well as what chemical reactions of an enzyme may be desirable to catalyze and such desirabilities/undesirabilities will generally depend on the application in which the enzyme is used. Furthermore, it is asserted that one skilled in the art of biotechnology would be apprised of the scope of "similar enzymatic properties". Thus, one skilled in the art of biotechnology would be apprised with a reasonable degree of precision and particularity what the terms "similar", "desired properties", "undesired properties", and "desired chemical reactions" refer to for an enzyme. Consequently, the fact that such terms are not defined in the specification does not render the phrases "functional equivalent", "structural analog", and "sequence analog" indefinite. A patent specification need not teach, and preferably omits, what is well known in the art. *Hybritech Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986).

Moreover, the fact the examples disclosed in specification regarding the terms "functional equivalent", "structural analog", and "sequence analog" do not encompass every possible consideration for the terms does not render the terms indefinite. In particular, it is asserted that those skilled in the art of biotechnology would readily recognize that the examples provided in the specification are offered to support the definitions set forth for the terms, but in no way serve an exhaustive list of possibilities encompassed by the terms. The terms and phrases "example", "such as" and "may possess" used in such descriptions of the specification acerbate this assertion as a skilled artisan in any scientific field recognizes that examples are not definitive, the term "such as" refers to examples, and the use of the term "may" does not constitute a necessity. As noted above, it is asserted that one skilled in the art would be apprised of the scope of the terms "functional equivalent", "structural analog", and "sequence analog" with a reasonable degree of precision and particularity based on the definitions of such terms provided in the specification. The teachings of examples of what may be encompassed in the scope of those terms does not introduce ambiguity to those terms and, thus, does not render the terms indefinite. It is the Applicant's position that the Examiner is improperly analyzing the description of the terms 'functional equivalent', 'structural analog', and 'sequence analog' in the specification in a vacuum and is not taking into consideration how one of skill in the art would interpret such terms based on such disclosure.

The aforementioned assertions are substantiated by in a declaration by Dr. Melinda E. Wales, Ph.D. under 37 C.F.R. § 1.132 filed in conjunction with this response. In particular, Dr. Melinda E. Wales, a person of skill in the art of biotechnology, declares that one skilled in the art of biotechnology would be apprised of the scope of the terms "functional equivalent", "structural analog", and "sequence analog" for claims 21-27 with a reasonable degree of precision and particularity based on the description of such terms provided in the specification and what is readily known in the art regarding E.C. 3.1.8 enzymes. \

For at least the reasons set forth above, it is asserted that the structural and functional limitations of the genera of any 'functional equivalent', 'structural analog', and 'sequence

analog' is clear in the specification and, thus, a skilled artisan would know the metes and bound of claims 21-27.

**Section 112, 1st Paragraph, Rejections**

Claims 1, 15-27, 67, 69-75, 79-89, 94-100, 102, 110-119, 121-135, 180-182, 217, 219-242, 251-255, 272, 309, 319-321, 323, 324, 326, 327, 343-356, 360-362, 365-373, 376-385 and 389-394 were rejected under 35 U.S.C. § 112, first paragraph, for the specification failing to provide enablement for the subject matter of the claims. In addition, such claims were further rejected under 35 U.S.C. § 112, first paragraph, for containing subject matter which was not described in the specification in such a way to reasonably convey to one skilled in the art that the inventors had possession of the claimed invention. Claims 113, 114, 118-122, 309, 378 and 392 have been canceled and, thus, their rejections are moot. The Applicant respectfully traverses the rejection of the pending claims and maintains the arguments presented in the communications filed August 27, 2008 and September 28, 2009 by the Applicant. The arguments are incorporated by reference as if fully set forth herein, but all have not been reiterated below for the sake of brevity.

It is asserted that the specification clearly and sufficiently describes the manner of making and using coatings, elastomers, adhesives, sealants, and waxes including any active enzyme of E.C. 3.1.8 (see, e.g., ¶¶ 0321-0450, 0490, 0560-0570, 0574-0584, 0622-0635, and 0647-0664). In particular, the specification provides ample guidance and direction on combining various components used to form coatings, elastomers, adhesives, sealants, and waxes with an enzyme to produce coatings, elastomers, adhesives, sealants, and waxes having an enzyme. In addition, the specification provides ample guidance and direction on mixing prepared coatings elastomers, adhesives, sealants and waxes with an enzyme to produce coatings, elastomers, adhesives, sealants, and waxes having an enzyme. The specification clearly sets forth the enzyme formulated with such coatings, elastomers, adhesives, sealants, and waxes may be any active enzyme of E.C. 3.1.8 (see, e.g., ¶¶ [0129] to [0153], [0168] to [0191], [0202], [0205], [0213], [0215], [0216], [0226], [0236], [0237], [0239], [0240], [0676], [0688], and [0718]). Moreover, the specification

clearly sets forth how to make coatings, elastomers, adhesives, sealants, and waxes comprising enzymes with any known components for imparting desired properties for coatings, elastomers, adhesives, sealants, and waxes, such as but not limited to binders, fillers, and preservatives, for example (see, e.g., ¶¶ 0293, 0302, 0309, 0310, 0313, 0316, 0377, 0391, 0396, 0400, 0415, 0427, 0439 and 0565). The specification clearly sets forth how to use coatings, elastomers, adhesives, sealants, and waxes comprising an enzyme, specifically by applying the coatings, elastomers, adhesives, sealants, and waxes to a surface (see, e.g., ¶ [0084]).

The aforementioned assertions are substantiated by in declarations by Dr. Melinda E. Wales, Ph.D. and Dr. James W. Rawlins under 37 C.F.R. § 1.132 filed in conjunction with this response. In particular, Dr. Melinda E. Wales, a person of skill in the art of biotechnology, and Dr. James W. Rawlins, a person of skill in the art of coatings and polymer science, declare the specification clearly and sufficiently describes the manner of making and using coatings, elastomers, adhesives, sealants, and waxes including any active enzyme of E.C. 3.1.8.

As noted in the communications filed August 27, 2008 and September 28, 2009 by the Applicant, the Applicants assert those of skill in the art of biotechnology are aware and readily recognize that an active enzyme of E.C. 3.1.8 may be derived by techniques which are known in the art. In addition, the specification clearly sets forth how to analyze and test the enzymatic activity of coatings, elastomers, adhesives, sealants, and waxes formulated with enzymes. Moreover, the Applicant asserts one skilled in the art of biotechnology would be apprised, simply on their knowledge of enzymes, of how to analyze and test the enzymatic activity of coatings, elastomers, adhesives, sealants, and waxes formulated with enzymes and, thus, would be apprised of how to identify a structure of an enzyme of EC 3.1.8, or variants or analogs thereof, which are active within a coating, elastomer, adhesive, sealant, or wax. Furthermore, it is asserted one skilled in the art would be able to ascertain the tolerance of enzymes identified to be active in coatings, elastomers, adhesives, sealants, and waxes, regarding modification and extent of the tolerance. In addition, one skilled in the art of biotechnology would be able to ascertain the regions of any enzymes which may or may not be modified without affecting enzyme activity within a coating, elastomer, adhesive, sealant, or wax. Based on such, one skilled in the art would

be able to establish a rational and predictable scheme for identifying or making a genus of EC 3.1.8 enzymes having activity within a coating, elastomer, adhesive, sealant, or wax.

Furthermore, as noted in the communications filed August 27, 2008 and September 28, 2009 by the Applicant, techniques for identifying active enzymes of E.C. 3.1.8 are not only known in the art of biotechnology, but are routinely performed in the art of biotechnology. Although the number of enzymes to screen for applicable activity in a coating, elastomer, adhesive, sealant, or wax may be vast, the number is not unlimited as purported by the Examiner and screening such a number does not undue experimentation.

The aforementioned assertions are substantiated by in a declaration by Dr. Melinda E. Wales, Ph.D. filed in conjunction with this response. In particular, Dr. Melinda E. Wales, a person of skill in the art of biotechnology, declares one skilled in the art would be able to ascertain the possible modifications and tolerances of modification to EC 3.1.8 enzymes to render them active in a coating based on the disclosure in the specification.

As noted in the communications filed August 27, 2008 and September 28, 2009 by the Applicant, the specification also clearly sets forth how to analyze and test the enzymatic activity of coatings, elastomers, adhesives, sealants, and waxes formulated with enzymes. Moreover, it is well known in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes of how to analyze and test coatings, elastomers, adhesives, sealants, and waxes for suitable properties associated with different components of the coatings, elastomers, adhesives, sealants, and waxes. In addition, it is well known in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes of how to test and change formulations of components to meet suitable properties for coatings, elastomers, adhesives, sealants, and waxes. Based on such, the Applicant asserts those of skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would be apprised of how to analyze coatings, elastomers, adhesives, sealants, and waxes formulated with an E.C. 3.1.8 enzyme to determine which, if any, components of the coatings, elastomers, adhesives, sealants, and waxes may, or may not, be modified without affecting the activity of the enzyme.

In addition, one skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would, based on such analysis, be able to establish a rational and predictable scheme for identifying components of coatings, elastomers, adhesives, sealants, and waxes which allow and those which inhibit an E.C. 3.1.8 enzyme's activity. Moreover, one skilled in the art of coatings and the material sciences of elastomers, adhesives, sealants, and waxes would be able to identify coating, elastomer, adhesive, sealant, and wax compositions, on the whole, which allow an E.C. 3.1.8 enzyme to be active, those which inhibit the activity of an E.C. 3.1.8 enzyme, and those in which the comprised enzyme of E.C. 3.1.8 is stable for more than one month or more than one year. Conducting such analyses, establishing such schemes, and identifying such coating, elastomer, adhesive, sealant, and wax compositions would not require undue experimentation since such actions are routinely performed in the art for components in such classes of materials.

The aforementioned assertions are substantiated by in a declaration by Dr. James W. Rawlins, Ph.D. filed in conjunction with this response. In particular, Dr. James W. Rawlins, a person of skill in the art of coatings and polymer science, declares one skilled in the art would be able to ascertain the which coatings and modifications of coating components would inhibit and also have an affect EC 3.1.8 enzyme activity based on what is readily known in the art and the disclosure in the specification.

For at least the reasons cited above, it is asserted that the specification enables one skilled in the art to make and use the limitations of the present claims. In addition, it is asserted that the specification conveys to one skilled in the art that the inventor had possession of the claimed subject matter and, therefore, the written description requirement is satisfied for the present claims. Accordingly, removal of 35 U.S.C. § 112, first paragraph rejections of the claims is respectfully requested.

**Section 102 Rejection**

Claims 1, 15-20, 67, 69-72, 74, 75, 79-89, 94-100, 102, 110-119, 121-135, 180-182, 217, 219-223, 234-238, 251-255, 272, 319, 320, 343, 344, 351, 352, 354-356, 360-362, 365-373, 376-385 and 389-394 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,998,200 to Bonaventura et al. (hereinafter referred to as "Bonaventura") as evidenced by a document entitled "Micronized Porous Silica Gel" supplied by W.R. Grace & Co. (referred to herein as "W. R. Grace & Co."). As noted above, claims 113, 114, 118, 119, 121, 122, 378 and 392 have been canceled and, thus, their rejection is moot. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. Of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987), MPEP 2131. Bonaventura does not disclose all limitations of the pending claims, some distinctive limitations of which are set forth in more detail below.

**Bonaventura does not teach or suggest an architectural coating, an automotive coating, a can coating, a chemical agent resistant coating (CARC), a camouflage coating, a traffic marker coating, or an aircraft coating.** Independent claim 1 recites:

> A paint comprising an enzymatically active esterase classified in an enzyme subclass designated by Enzyme Commission number EC 3.1.8, wherein the paint is an architectural paint, an automotive paint, a can paint, a chemical agent resistant paint, a camouflage paint, a traffic marker paint, or an aircraft paint.

Independent claims 272, 319, 368, 393 and 394 include similar limitations clarifying the type of coatings to which the claims are directed. Support for the amendments to these claims may be found, for example, in paragraphs [0050], [0329], [0349], [0356], [0364], [0368], and [0371] of the specification.

As noted in the communication filed on September 28, 2009 by the Applicant, Bonaventura does not teach, suggest or provide any motivation to create a composition for use other than one in contact with an aquatic environment and, thus, does not teach the coatings

recited in the claims. In response thereto, the Examiner states the list of coatings recited in independent claims 1, 272, 319, 368, 393 and 394 do not exclude paints for marine surfaces, that there is an expectation that the paint taught in Bonaventura can be used on surfaces other than marine surfaces, and many of coatings recited in independent claims 1, 272, 319, 368, 393 and 394 are applicable for marine surfaces (see, page 19 of the office action). It is asserted that the evaluation of whether Bonaventura anticipates claims 1, 272, 319, 368, 393 and 394 is not whether the coating compositions taught in Bonaventura may be used for the intended use reflected in the coating terms recited in the claims, but is whether the coating compositions taught in Bonaventura match the structural limitations of the coating terms recited in claims 1, 272, 319, 368, 393 and 394. As set forth in detail below, the coatings recited in independent claims 1, 272, 319, 368, 393 and 394 are compositionally distinct from the coatings taught in Bonaventura and, thus, Bonaventura fails to anticipate such claims.

It is of the general knowledge to those of ordinary skill in the art of polymer chemistry that coatings are designed with the "end in mind". Very specifically, each is formulated to result in materials suitable for the particular environment in which they are intended to be used. As such, although the specific coatings recited in claims 1, 272, 319, 368, 393 and 394 are termed in a manner of their intended application, the terms each convey their own compositional differences and the terms are not simply differentiated by their intended use alone or by the surfaces to which they will be applied as purported by the Examiner on page 19 of the office action. On the contrary, the use denoted in the coating terms dictates the necessary performance which in turn becomes a critical requirement for method of application, specific coating composition and ultimate performance. Thus, different types of coatings are compositionally distinct from each other. None of the coating types recited in claims 1, 272, 319, 368, 393 and 394 refer to coatings specifically formulated for contact with an aquatic environment, including the environments noted by Bonaventura *et al.* as being encompassed by the term 'aquatic environment' (see, column 5, line 50 to column 6, line 13 of Bonaventura). Thus, the coating types recited in claims 1, 272, 319, 368, 393 and 394 are structurally distinct from the coatings taught in Bonaventura.

For the record, it is further noted that the claimed coating types are recognized by those of skill in the art as terms imparting the compositional and materials differences, structural characteristics and performance differences associated with each type of coating so that the coating material is a composition suitable for their intended end use applications. Those of ordinary skill in the art of coatings are aware and recognize that the end use application forces formulation differences and in turn requires materials, compositional, and performance characteristics associated with each type of coating. As such, one of ordinary skill in the art would be aware that the scope of the subject matter recited in claims 1, 272, 319, 368, 393 and 394 is directed to and is limited to coatings of the recited coating types.

The aforementioned assertions are substantiated in a declaration by Dr. James W. Rawlins, Ph.D. under 37 C.F.R. § 1.132 filed in conjunction with this response. In particular, Dr. James W. Rawlins, a person of skill in the art of coatings and polymer science, declares that the different coating types recited in the claims impart compositional differences and one skilled in the art would recognize such based on the recitation of the coating terms. In addition, Dr. James W. Rawlins declares that none of the coating types recited in claims 1, 272, 319, 368, 393 and 394 refer to coatings specifically formulated for contact with an aquatic environment and, thus, the coating types recited in claims 1, 272, 319, 368, 393 and 394 are structurally distinct from the coatings taught in Bonaventura.

**Bonaventura does not teach or suggest an elastomer, adhesive, a sealant or a wax having an E.C. 3.1.8 enzyme.** Independent claim 319 recites:

> A surface treatment comprising an enzymatically active esterase classified in an enzyme subclass designated by Enzyme Commission number EC 3.1.8 ... wherein the surface treatment is ... an elastomer, an adhesive, a sealant or a wax.

Support for the amendment to claim 319 adding "an elastomer, an adhesive, a sealant or a wax" may be found, for example, in paragraphs [0109], [0879], [0881], [0882], and [0884] of the specification. There is no teaching in Bonaventura of incorporating the immobilized bioactive species described therein in elastomers, adhesives, sealants or waxes. Furthermore, it is of the general knowledge to those of ordinary skill in the art of polymer chemistry that elastomers,

adhesives, sealants, and waxes are structurally distinct compositions from coatings. Such assertions are substantiated in a declaration by Dr. James W. Rawlins, Ph.D. under 37 C.F.R. § 1.132 filed in conjunction with this response. In particular, Dr. James W. Rawlins, a person of skill in the art of coatings and polymer science, declares the coatings disclosed in Bonaventura do not include an elastomer, an adhesive, a sealant or a wax.

For at least the reasons set forth above, Bonaventura does not anticipate the limitations of independent claims 1, 272, 319, 368, 393 and 394 or any claims dependent therefrom. As noted above, claims 113, 114, 118, 119, 121, 122, 378 and 392 are canceled rendering rejection thereto moot. Accordingly, removal of the 35 U.S.C. § 102(b) rejection in the Office Action is respectfully requested.

Further to the arguments presented above, is it noted that the Examiner's citation of W. R. Grace & Co. as evidence to the teachings Bonaventura is not clear. Clarification is requested. As set forth below, the Applicant has attempted to interpret the citation in the interest of advancing the captioned case to issuance more quickly (i.e., by addressing teachings of all art cited). Applicant notes that if the citation has interpreted correctly, the citation is erroneous.

The Examiner states on page 18 of the Office Action, "The paints of Bonaventura et al comprise polyurethane hydrogel, which has a thermoplastic binder, silica microspheres, and an antifoamer (Grace, Inc).". There does not appear to be any other reference regarding the teachings of W. R. Grace & Co. in the Office Action. The Examiner fails to note what W. R. Grace & Co. is cited to evidence, but the Applicant presumes it is to show that a characteristic not disclosed in Bonaventura is inherent, since the other two reasons for citing multiple references in a 35 U.S.C. 102 rejection do not seem to apply (i.e., to prove the primary reference contains an enabled disclosure or to explain the meaning of a term used in the primary reference) (see, MPEP 2131.01).

Bonaventura teaches incorporating the enzymes described therein within an immobilization matrix made from a hydrophilic polyurethane prepolymer, such as supplied by

Grace Chemical Co., prior to being mixed with a coating such that the enzymes can maintain their activity in the coating. Bonaventura teaches the use of two classes of polyurethane prepolymers: foam-forming prepolymers and gel-forming prepolymers, the latter of which W. R. Grace & Co. refers to as a hydrogel (*see*, Bonaventura: column 13, lines 19-37; column 19, lines 1-13; column 34, lines 53-61). Based on such teachings of Bonaventura and what appears to be the sole statement regarding the teachings of W.R. Grace & Co. in the Office Action, the Applicant presumes the Examiner deems W. R. Grace & Co. as teaching a polyurethane hydrogel having a thermoplastic binder, silica microspheres, and an antifoamer and deems such components are inherent components of the coating described in Bonaventura. If the Applicant is incorrect in his presumption, clarification is requested as to the basis of the citation of W.R. Grace & Co.

W. R. Grace & Co. provides a description of microporous silica gel particles, including micronized porous silica hydrogels which are described as being unique for their low dusting tendency and allowance for rapid incorporation into aqueous formulations. There is no other description of hydrogels in W. R. Grace & Co. Based on the teachings of W. R. Grace & Co., the Applicant concurs silica material is an inherent component of the coatings described in Bonaventura when a hydrophilic polyurethane gel-forming prepolymer is used to form an immobilization matrix added to the coatings. However, there is no basis in W. R. Grace & Co. that such coatings or any other coatings described in Bonaventure necessarily include a thermoplastic binder or an antifoamer as presumably purported by the Examiner. Consequently, the statement made in the Office Action regarding W. R. Grace & Co. and the citation of the reference as evidence to what is taught in Bonaventura is asserted to be erroneous.

**Section 103 Rejections**

Claims 21-27 were rejected under 35 U.S.C. § 103(a) as being unpatentable over by Bonaventura in view of a paper entitled "*Rational design of organophosphorus hydrolase for altered substrate specificities*," by Di Sioudi et al. (hereinafter referred to as "Di Sioudi") and in further in view of a datasheet for enzymes classified as EC 3.1.8.1 taken from the ExPASy

(Expert Protein Analysis System) Proteomics Server provided by the Swiss Institute of Bioinformatics (hereinafter referred to as "ExPASy") or in view of a paper entitled "*Immobilization of β-Galactosidase for Application in Organic Chemistry Using a Chelating Peptide*" to Piesecki et al. (hereinafter referred to as "Piesecki"). Claims 73, 323 and 324 were rejected under 35 U.S.C. § 103(a) as being unpatentable over by Bonaventura in view of datasheets on sodium phosphate dibasic and carbonate-bicarbonate buffer provided from Sigma-Aldrich Co. (hereinafter referred to as "Sigma"). Claims 224-233, 326 and 327 were rejected under 35 U.S.C. § 103(a) as being unpatentable over by Bonaventura in view of U.S. Patent No. 4,495,239 to Pusch et al. (hereinafter referred to as "Pusch"). Claims 239-242 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bonaventura in view of U.S. Patent Application No. 2005/0202102 to Miller (hereinafter referred to as "Miller"). Claim 309 was rejected under 35 U.S.C. 103(a) as being unpatentable over Bonaventura in view of a paper entitled "*The bile acid-inducible baiF gene from Eubacterium sp. strain VPI 12708 encodes a bile acid-coenzyme A hydrolase*" to Ye et al. (hereinafter referred to as "Ye"). Claims 321 and 345-347 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bonaventura in view of U.S. Patent No. 5,096,813 to Krumhar et al. (hereinafter referred to as "Krumhar"). Claims 348-350 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bonaventura in view of U.S. Patent No. 4,999,306 to Yafuso et al. (hereinafter referred to as "Yafuso").

To establish a *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974), MPEP 2143.03. Obviousness cannot be established by combining or modifying the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion or incentive to do so. *In re Bond,* 910 F. 2d 81, 834, 15 USPQ2d 1566, 1568 (Fed. Cir. 1990). As noted above, claim 309 has been canceled, rendering rejection thereto as well as the citation of Ye moot. As set forth below, none of the cited art, taken alone or in combination, discloses all limitations of the pending claims, some distinctive limitations of which are set forth in more detail below.

**It would not be obvious to a skilled artisan based on the teachings of Bonaventura to incorporate the immobilized bioactive species taught by Bonaventura in an architectural coating, an automotive coating, a can coating, a sealant coating, a chemical agent resistant coating (CARC), a traffic marker coating, an aircraft coating, an elastomer, an adhesive, a sealant or a wax.** These are the limitations of claims 1, 272, 319, 368, 393 and 394 referred to above for refuting the anticipation rejection of such claims. Contrary to the statement made by the Examiner on page 19 of the office action, there is no expectation from the viewpoint of one skilled in the art of polymer chemistry that the coatings described in Bonaventura would be used on surfaces other than those to be placed in contact with an aquatic environment. In particular, the objective of the coatings described in Bonaventura is to prevent fouling of an aquatic apparatus when placed in an aquatic environment and, thus, one skilled in the art of polymer chemistry would not expect the coatings to be used on non-aquatic apparatuses. Further to that regard, the bioactive species included in the coatings taught in Bonaventura are configured to only reduce the fouling of aquatic organisms and, thus, would not serve to provide antifouling properties in a non-aquatic environment or for extended service.

For at least such reasons, using the coatings described in Bonaventura on non-aquatic apparatuses and/or incorporating the bioactive species taught in Bonaventura in any of the coatings recited in claims 1, 272, 319, 368, 393 and 394 would be futile and would be contrary to the accepted wisdom in the art of coatings. In particular, there would be no reasonable expectation of success that the coatings could reasonably provide the antifouling properties discussed in Bonaventura and, thus, the invention disclosed in Bonaventura would be rendered unsatisfactory for its intended purpose. Obviousness does not require absolute predictability, however, at least some degree of predictability is required. Evidence showing there was no reasonable expectation of success may support a conclusion of nonobviousness. *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976) (MPEP 2143.02). If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) (MPEP 2143.01).

Such assertions are substantiated in a declaration by Dr. James W. Rawlins, Ph.D. under 37 C.F.R. § 1.132 filed in conjunction with this response. In particular, Dr. James W. Rawlins, a person of skill in the art of coatings and polymer science, declares that one skilled in the art of coatings would not be apprised nor motivated in view of Bonaventura to include the bioactive material described therein in an elastomer, an adhesive, a sealant, a wax or any of the coatings recited in claims 1, 272, 319, 368, 393 and 394.

**None of DiSioudi, ExPASy, Piesecki, Sigma, Pusch, Miller, Krumhar, or Yafuso teach or suggestion incorporating an enzymatically active esterase of Enzyme Commission number EC 3.1.8 into a surface treatment, much less in an elastomer, an adhesive, a sealant, a wax or the coating types recited in independent claims 1, 272, 319, 368, 393 and 394.** In fact, none of DiSioudi, ExPASy, Piesecki, or Sigma even mention an application of a surface treatment and, thus, provide no teaching or suggestion to overcome the deficiencies of Bonaventura. Although Pusch, Miller, Krumhar, and Yafuso each teach applications of coatings, none of such references include an EC 3.1.8 enzyme and, thus, do not teach or suggest the limitations of independent claims 1, 272, 319, 368, 393 and 394. Moreover, as noted above, it would not be conducive for a skilled artisan to incorporate the bioactive species taught in Bonaventura into any coatings other than those formulated for an aquatic environment. None of Pusch, Miller, Krumhar, and Yafuso provides any teaching or suggestion to combat that logic and, thus, any combination of Bonaventura with Pusch, Miller, Krumhar, and Yafuso would yield an aquatic coating. As set forth above, an aquatic coating is compositionally distinct from the coating types recited in independent claims 1, 272, 319, 368, 393 and 394 and, thus, none of Pusch, Miller, Krumhar, and Yafuso provides any teaching or suggestion to overcome the deficiencies of Bonaventura with respect to the coating types recited in claims 1, 272, 319, 368, 393 and 394.

Furthermore, none of Pusch, Miller, Krumhar, and Yafuso teach applications of an elastomer, a sealant, or a wax and, none of such references provides any teaching or suggestion to overcome the deficiencies of Bonaventura with respect to elastomers, sealants or waxes.

None of Miller, Krumhar, and Yafuso teach applications of an adhesive. Although Pusch teaches an application of an adhesive, Pusch emphasizes the paints and adhesives are formulated for materials such as nets and fabrics that are terrestrial (see abstract, lines 15-16; column 2, lines 33-36), that is, land based in nature, and hence teaches paints and adhesives that are non-aquatic in nature. Further, applicant asserts that the function of the paints and nets taught in Pusch is contingent on "air flow" as described at column 2, lines 61-68, which is diametrically different in function than an aquatic coating formulated for function in water. Consequently, it is asserted that there is no motivation to combine the teachings of Pusch and Bonventura to read on the limitations of claims 1, 272, 319, 368, 393 and 394.

**Moreover, Miller is not available as prior art against the captioned case.** The Applicant traverses the Examiner's apparent assertion on page 24 of the Office Action that Miller is considered prior art as of June 2, 2002. In particular, a foreign priority date does not serve as the effective filing date for establishing prior art and, thus, June 2, 2002 is not the effective filing date of Miller. Applicant cites and paraphrases MPEP 706.02 for support:

> If the application claims foreign priority under 35 U.S.C. 119(a)-(d) or 365(a) or (b), the effective filing date is the filing date of the U.S. application, unless the application is a continuation, divisional or continuation-in-part application. In the latter scenarios, the effective filing date of a continuation, divisional or continuation-in-part application is that of the parent application. In any case, the filing date of the foreign priority document is not the effective filing date.

Rather, the effective filing of Miller is the filing date of the PCT application PCT/IL03/00461, specifically June 2, 2203. The Examiner acknowledges on page 2 of the Office Action that the priority date for the currently examined claims is September 9, 2002. Since the effective filing date of Miller claims is subsequent to the priority date of the captioned case, Miller is not available prior art against the captioned case.

For at least the reasons cited above, none of the cited art, taken alone or in combination, teaches or suggests the limitations of independent claims 1, 272, 319, 368, 393 and 394. As such, claims 1, 272, 319, 368, 393 and 394 as well as all dependent claims thereto are patent distinct over the cited art. As noted above, claim 309 has been canceled and, thus, the rejection

of such a claim is moot. Accordingly, based on the forgoing, removal of all the § 103(a) rejections is respectfully requested.

## CONCLUSION

This response constitutes a complete response to all of the issues raised in the Office Action mailed February 19, 2010. In view of the amendments and remarks herein, Applicants assert that pending claims 1, 15-28, 31-35, 37-52, 55-63, 67, 69-75, 79-108, 110-112, 115-117, 123-256, 272, 319-362, 365-373, 376, 377, 379-391, 393 and 394 are in condition for allowance. If the Examiner has any questions, comments, or suggestions, the undersigned earnestly requests a telephone conference.

The Commissioner is authorized to charge any fees which may be required, or credit any overpayment, to deposit account no. 50-1085.

Respectfully submitted,

/C. Steven McDaniel/
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Date: August 19, 2010